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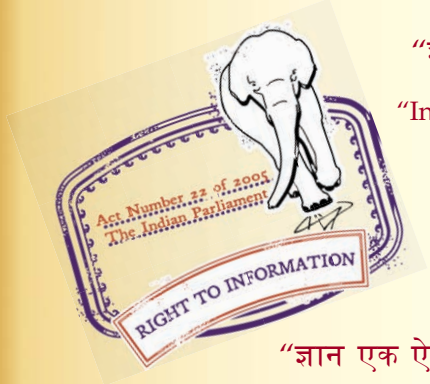
IS 5031 (1992): Saws - Metal Slitting [PGD 32: Cutting tools]



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IS 5031 : 1992
(Reaffirmed 2002)

भारतीय मानक

आरा — धातु चीरने वाला — विशिष्टि

(दूसरा पुनरीक्षण)

Indian Standard

SAWS — METAL SLITTING — SPECIFICATION

(Second Revision)

UDC 621·934

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

June 1992

Price Group 5

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Milling Cutters, Saws, Gear Cutting Tools and Broaches Sectional Committee had been approved by the Production Engineering Division Council.

This standard was first published in 1969. The first revision was completed to bring this standard in line with ISO. Subsequently, the second revision has been necessitated to bring it in line with current practices being followed in Indian Industry and to include the following requirements:

a) Angular (AW) and curved (BW) tooth with alternate side chamfer; and

b) Side clearance in the case of slitting saws less than 0·5 mm.

In the preparation of this standard, considerable assistance has been drawn from the following standards:

DIN 1837-1970 'Metallkreissageblatter; feingezahnt' (Circular metal slitting saw blades fine-toothed) and DIN 1838-1970 'Metal slitting saws: coarse pitch' issued by Deutsches Institut Für Normung, DIN.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

SAWS—METAL SLITTING—SPECIFICATION

(Second Revision)

1 SCOPE

This standard covers the dimensions and other requirements for metal slitting saws with fine pitch and coarse pitch teeth.

2 REFERENCES

Following Indian Standards are the necessary adjuncts to this standard.

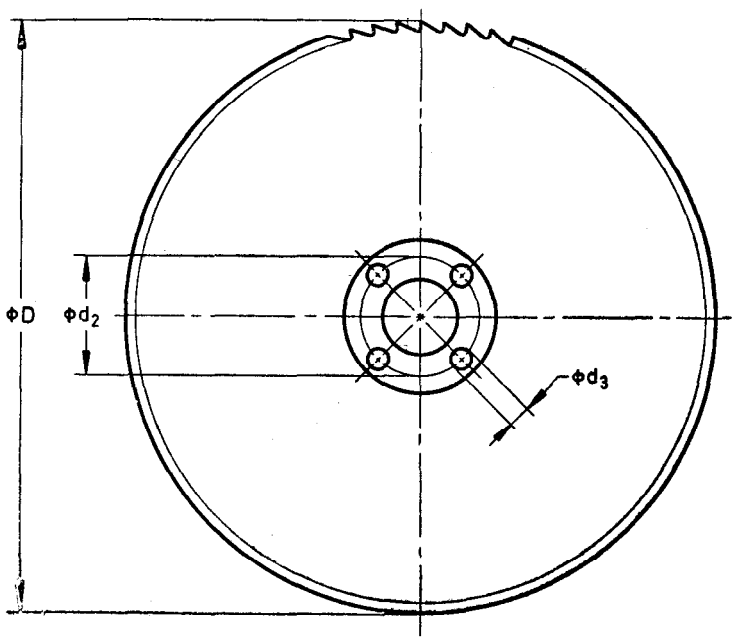
IS No.	*Title*
1830 : 1982	Technical supply conditions for milling cutters (*second revision*)
6285 : 1971	Dimensions for interchangeability of milling cutters and milling arbors with key drive
7778 : 1975	Method of sampling small tools

3 DIMENSIONS

3.1 Dimensions for saws with fine pitch teeth having diameter *D* from 20 to 315 mm shall be as given in Table 1 read with figure.

3.2 Dimensions for saws with coarse pitch teeth having diameter *D* from 32 to 315 mm shall be as given in Table 2 read with figure.

3.3 Saws having diameter (*D*) = 200 mm and above may be provided with driving holes. The driving holes shall have the dimensions as per Fig. 1.



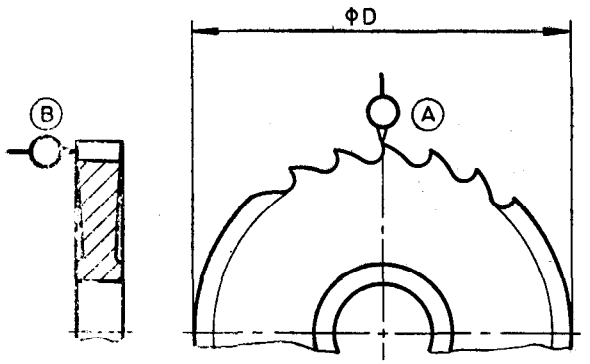
All dimensions in millimetres.

D	d_2 js12	d_3 js14
200 250	50	9
315	63	11

FIG. 1

4 RUNOUT TOLERANCE

Radial runout measured at point *A* and axial runout measured at point *B* shall be as per Fig. 2.



All dimensions in millimetres.

D		Axial Runout *Max*	Radial Runout *Max*
Over	Up to and Including		
—	40	0·10	0·10
40	100	0·16	0·10
100	200	0·25	0·16
200	315	0·40	0·16

NOTE — For checking purposes, the metal slitting saws shall be mounted on an arbor running true to within 10 micrometres.

FIG. 2

5 TOOTH FORM

Particulars about tooth form are given in Table 3.

6 GENERAL REQUIREMENTS

6.1 Side Clearance

Side clearance for metal slitting saws above 0·5 mm width shall be as given in Fig. 3.

6.2 For metal slitting saws less than 0·5 mm width, rake angle shall be zero to one degree and has to be on the positive side.

6.3 Saws shall have side relief up to the bore or up to the hub of diameter d_1, at the discretion of the manufacturer.

6.4 Unless otherwise specified, the saws are supplied without keyways, saws if required with keyways, shall be supplied as agreed upon between the purchaser and the manufacturer. Key-ways shall be according to IS 6285 : 1971.

6.5 For requirements not covered in this standard, it shall conform to the requirements of IS 1830 : 1982.

6.6 Unless otherwise specified, tooth shape *A* with tool type *N* shall be supplied for fine pitch saws and of tooth form *B* with tool type *N* for coarse pitch saws.

6.7 Special finish to be avoided as far as possible.

7 SAMPLING

The sampling and criteria of acceptance according to IS 7778 : 1975.

8 DESIGNATION

8.1 A metal slitting saw with fine pitch teeth having diameter (*D*) 125 mm, width (*b*) 1·6 mm, number of teeth (*n*) 128 of tooth form *A*, tool type *N* in special finish (SF) and conforming to this standard shall be designated as:

Metal Slitting Saw IS 5031 — 125 × 1·6 × 128 A N — SF

8.1.1 When the metal slitting saw is required with tool type *H* or *S*, the appropriate tool type shall be mentioned in the designation after size.

8.2 A metal slitting saw with coarse pitch teeth having diameter (*D*) 250 mm, width (*b*) 2·5 mm, number of teeth (*n*) 80 of tooth form *A*, tool type *H*, driving holes (*M*) and conforming to this standard shall be designated as:

Metal Slitting Saw IS 5031 — 250 × 2·5 × 80 AHM

9 NUMBER OR PITCH OF TEETH

Method of determining the number or pitch of teeth in accordance with the diameter and thickness of the metal slitting saw shall be as given in Annex A.

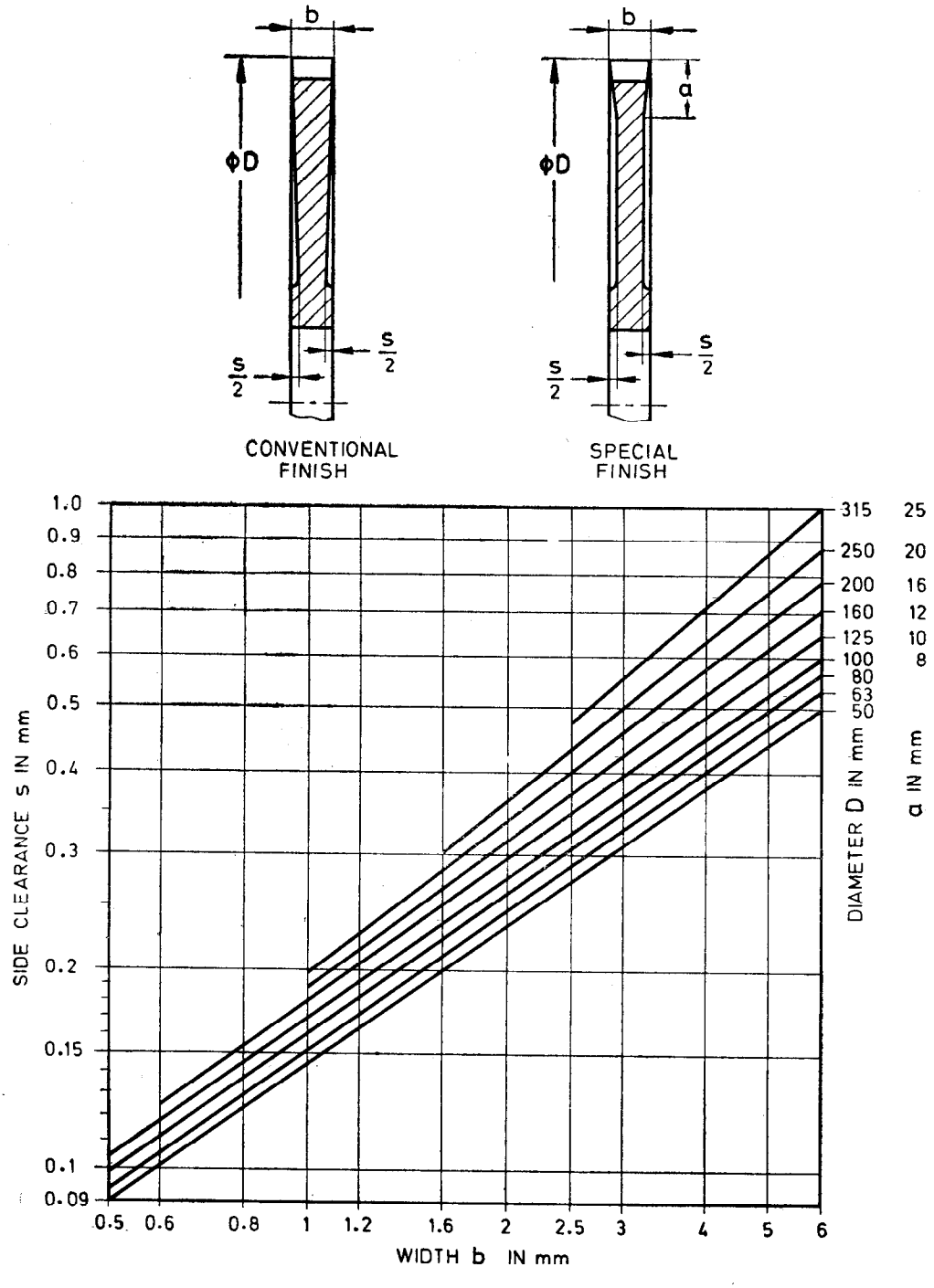
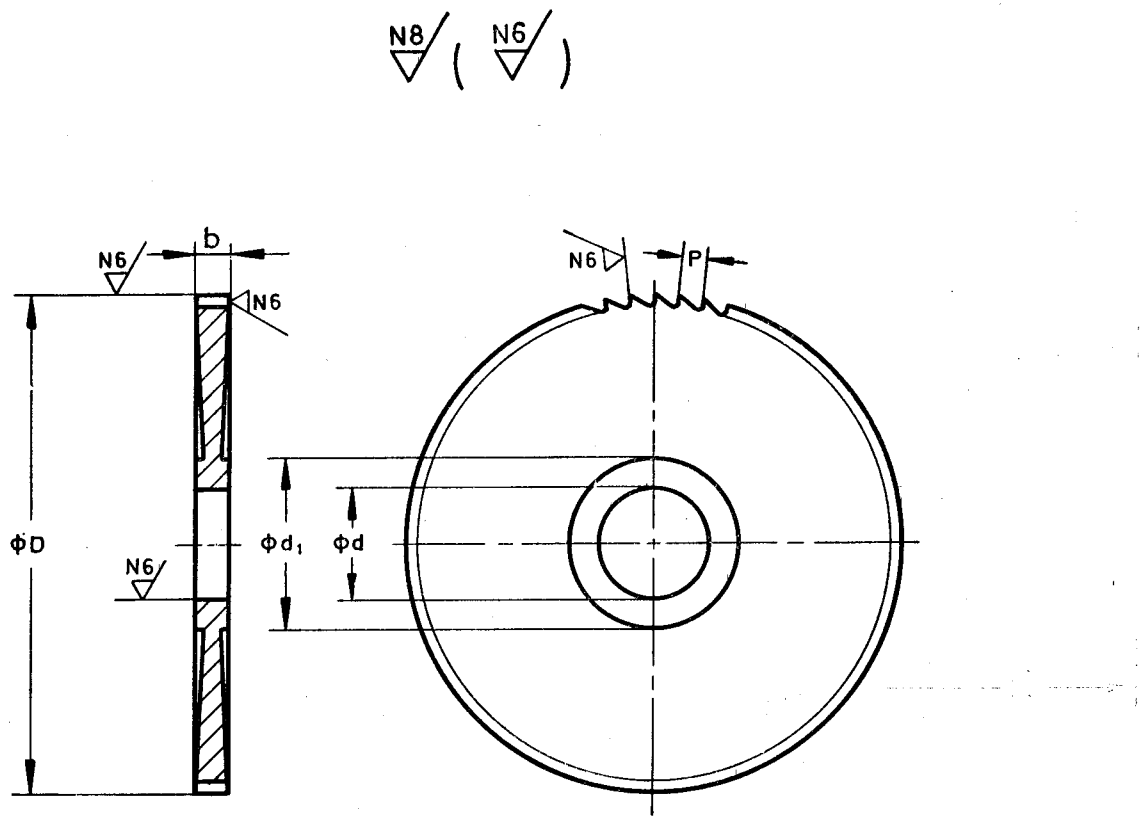

b
ϕD
S/2
S/2
CONVENTIONAL FINISH
b
a
ϕD
S/2
S/2
SPECIAL FINISH
SIDE CLEARANCE s IN mm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.15
0.1
0.09
0.5 0.6 0.8 1 1.2 1.6 2 2.5 3 4 5 6
WIDTH b IN mm
DIAMETER D IN mm
315 250 200 160 125 100 80 63 50
a IN mm
25 20 16 12 10 8

FIG. 3

Table 1 Dimensions for Metal Slitting Saws with Fine Pitch Teeth

(*Clause* 2.1)

All dimension in millimetres.



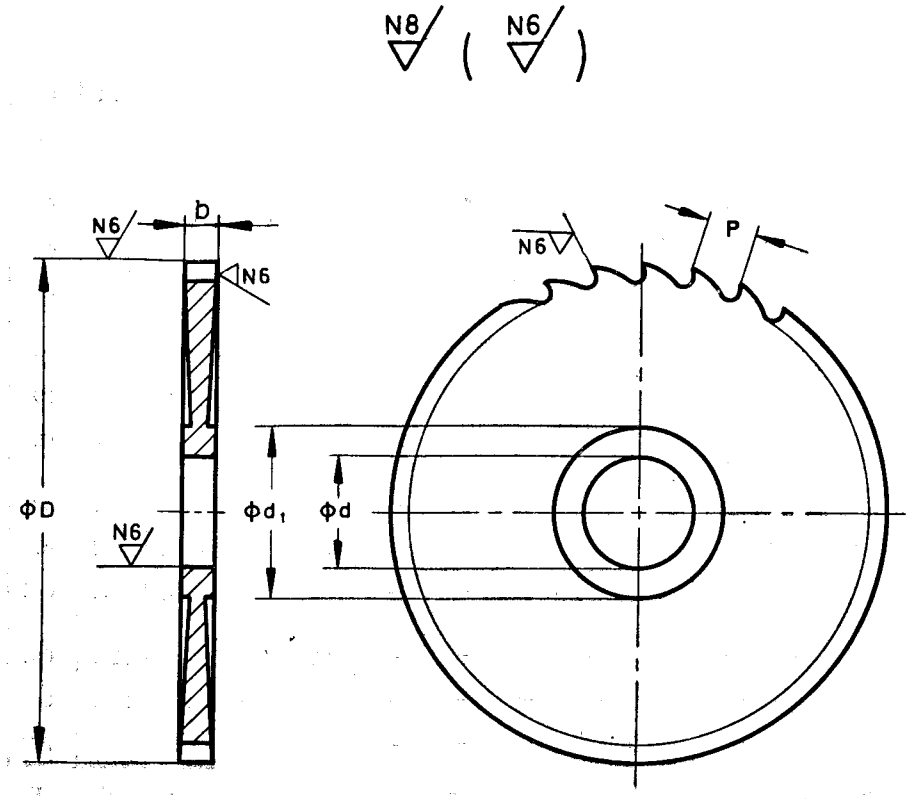
D js16	20		25		32		40		50		63		80		100		125		160		200		250		315	
d H7	5		8		8		10		13		16		22		22		22		32		32		32		40	
d_1 *Min*	Without Hub												34		34		34		47		63		63		80	
b js11	Pitch *P* and Number of Teeth *n*																									
	P	*n*	*P*	*n*	*P*	*n*	*P*	*n*	*P*	*n*	*P*	*n*	*P*	*n*	*P*	*n*	*P*	*n*	*P*	*n*	*P*	*n*	*P*	*n*	*P*	*n*
0·2	0·8	80	1·0	80	1·0	100	1·0	128	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0·25	1·0	64	1·0	80	1·0	100	1·25	100	1·25	128	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0·3	1·0	64	1·0	80	1·25	80	1·25	100	1·25	128	1·6	128	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0·4	1·0	64	1·25	64	1·25	80	1·25	100	1·6	100	1·6	128	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0·5	1·25	48	1·25	64	1·25	80	1·6	80	1·6	100	1·6	128	2·0	128	—	—	—	—	—	—	—	—	—	—	—	—
0·6	1·25	48	1·25	64	1·6	64	1·6	80	1·6	100	2·0	100	2·0	128	2·0	160	—	—	—	—	—	—	—	—	—	—
0·8	1·25	48	1·6	48	1·6	64	1·6	80	2·0	80	2·0	100	2·0	128	2·5	128	2·5	160	—	—	—	—	—	—	—	—
1·0	1·6	40	1·6	48	1·6	64	2·0	64	2·0	80	2·0	100	2·5	100	2·5	128	2·5	160	—	—	—	—	—	—	—	—
1·2	1·6	40	1·6	48	2·0	48	2·0	64	2·0	80	2·5	80	2·5	100	2·5	128	3·2	128	3·2	160	—	—	—	—	—	—
1·6	1·6	40	2·0	40	2·0	48	2·0	64	2·5	64	2·5	80	2·5	100	3·2	100	3·2	128	3·2	160	4·0	160	—	—	—	—
2·0	2·0	32	2·0	40	2·0	48	2·5	48	2·5	64	2·5	80	3·2	80	3·2	100	3·2	128	4·0	128	4·0	160	4·0	200	—	—
2·5	—	—	2·0	40	2·5	40	2·5	48	2·5	64	3·2	64	3·2	80	3·2	100	4·0	100	4·0	128	4·0	160	5·0	160	5·0	200
3·0	—	—	—	—	2·5	40	2·5	48	3·2	48	3·2	64	3·2	80	4·0	80	4·0	100	4·0	128	5·0	128	5·0	160	5·0	200
4·0	—	—	—	—	—	—	3·2	40	3·2	48	3·2	64	4·0	64	4·0	80	4·0	100	5·0	100	5·0	128	5·0	160	6·3	160
5·0	—	—	—	—	—	—	—	—	3·2	48	4·0	48	4·0	64	4·0	80	5·0	80	5·0	100	5·0	128	—	—	6·3	160
6·0	—	—	—	—	—	—	—	—	—	—	4·0	48	4·0	64	5·0	64	5·0	80	5·0	100	6·3	100	—	—	6·3	160

NOTE — The pitch *P* in relation to the number of teeth *n* of a metal slitting saw of a given diameter is expressed as an approximate rounded figure.

Table 2 Dimensions for Metal Slitting Saws with Coarse Pitch Teeth

(*Clause* 2.2)

All dimensions in millimetres.

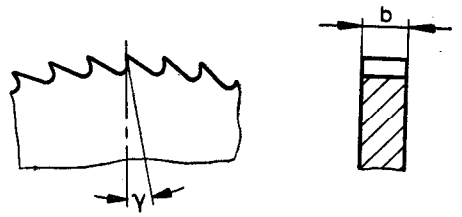
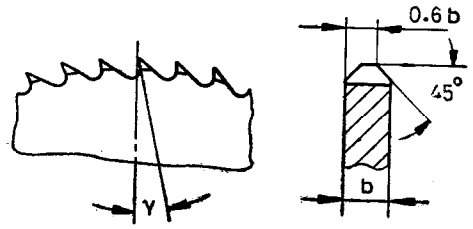
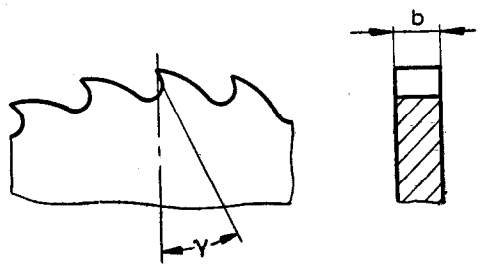
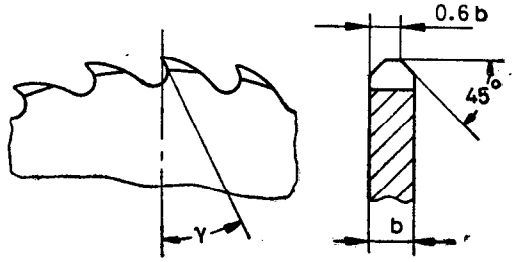
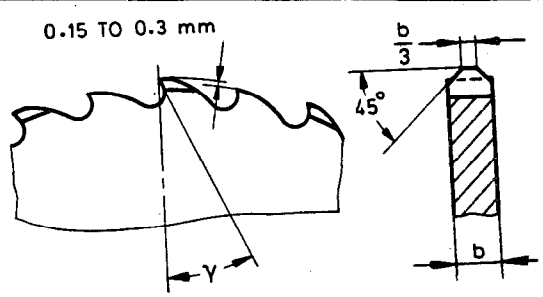


*D js*61	32		40		50		63		80		100		125		160		200		250		315	
d H7	8		10		13		16		22		22		22		32		32		32		40	
d_1 *Min*	Without Hub								34		34		34		47		63		63		80	
*b js*11	Pitch *P* and Number of Teeth *n*																					
	P	*n*	*P*	*n*	*P*	*n*	*P*	*n*	*P*	*n*	*P*	*n*	*P*	*n*	*P*	*n*	*P*	*n*	*P*	*n*	*P*	*n*
0·3	2·5	40	2·5	48	2·5	64	3·2	64	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0·4	2·5	40	2·5	48	3·2	48	3·2	64	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0·5	2·5	40	3·2	40	3·2	48	3·2	64	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0·6	3·2	32	3·2	40	3·2	48	4·0	48	4·0	64	—	—	—	—	—	—	—	—	—	—	—	—
0·8	3·2	32	3·2	40	4·0	40	4·0	48	4·0	64	5·0	64	—	—	—	—	—	—	—	—	—	—
1·0	3·2	32	4·0	32	4·0	40	4·0	48	5·0	48	5·0	64	5·0	80	—	—	—	—	—	—	—	—
1·2	4·0	24	4·0	32	4·0	40	5·0	40	5·0	48	5·0	64	6·3	64	6·3	80	—	—	—	—	—	—
1·6	4·0	24	4·0	32	5·0	32	5·0	40	5·0	48	6·3	48	6·3	64	6.3	80	8·0	80	—	—	—	—
2·0	4·0	24	5·0	24	5·0	32	5·0	40	6·3	40	6·3	48	6·3	64	8·0	64	8·0	80	8·0	100	—	—
2·5	5·0	20	5·0	24	5·0	32	6·3	32	6·3	40	6·3	48	8·0	48	8·0	64	8·0	80	10·0	80	10·0	100
3·0	5·0	20	5·0	24	6·3	24	6·3	32	6·3	40	8·0	40	8·0	48	8·0	64	10·0	64	10·0	80	10·0	100
4·0	—	—	6·3	20	6·3	24	6·3	32	8·0	32	8·0	40	8·0	48	10·0	48	10·0	64	10·0	80	12·5	80
5·0	—	—	—	—	6·3	24	8·0	24	8·0	32	8·0	40	10·0	40	10·0	48	10·0	64	12·5	64	12·5	80
2·0	—	—	—	—	—	—	8·0	24	8·0	32	10·0	32	10·0	40	10·0	48	12·5	48	12·5	64	12·5	80

NOTE—The pitch *P* in relation to the number of teeth *n* of a metal slitting saw of a given diameter is expressed as an approximate rounded figure.

Table 3 Tooth Form

(*Clause* 5)

Tooth Form		Figure	Angle of Rake γ for Tool Type			Application
Description	Symbol		*N* ±2°	*H* ±2°	*S* ±2°	
Angular tooth	*A*		5°	0°	10°	1) Fine pitch teeth (Table 1) 2) Conventional finish 3) Tool type *N*
Angular tooth with alternate side chamfer	A_w					1) Fine pitch teeth (Table 1) 2) Special finish 3) Tool type *H* or *S* $b \geq 2$
Curved tooth	*B*		15°	8°	25°	1) Coarse teeth (Table 2) 2) Conventional finish 3) Tool type *N* 1) Fine pitch teeth (Table 1) for $p \geq 3{\cdot}2$ 2) Special finish 3) Tool type *H* or *S*
Curved tooth with alternate side chamfer	B_w					1) Fine pitch teeth (Table 1) for $p \geq 3{\cdot}2$ and $b \geq 2$ 2) Special finish 3) Tool type *H* or *S* 1) Coarse teeth (Table 2) for $b \geq 2$ 2) Special finish 3) Tool type *H* or *S*
Curved tooth with roughing tooth and finishing out tooth alternatively	*C*					1) Fine pitch teeth (Table 2) for $P \geq 3{\cdot}2$ and $b \geq 2$ 2) Special finish 3) Tool type *H* or *S* 1) Coarse teeth (Table 2) for $b \geq 2$ 2) Special finish 3) Tool type *H* or *S*

NOTE — Tool type *N*, *H* and *S* shall be according to IS 1830 : 1982.

ANNEX A

(*Clause* 9)

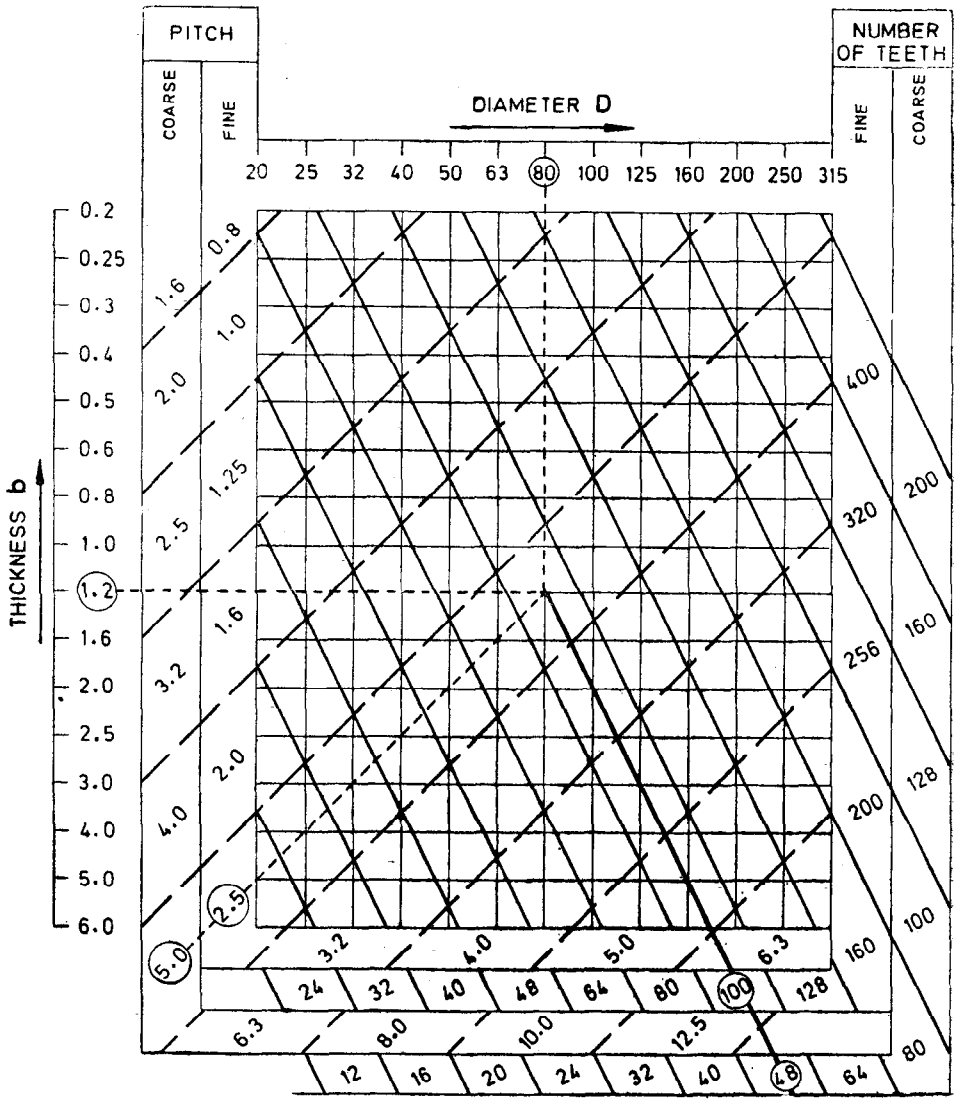
METHOD FOR DETERMINING THE NUMBER OR PITCH OF TEETH

A-1 The graph given below is for determining the number or pitch of the teeth in accordance with the diameter and width of the metal slitting saw.

A-2 USE OF THE GRAPH

A-2.1 *Example* — Determination of the number or pitch of the teeth of a metal slitting saw with an outside diameter, $D = 80$ mm and width, $b = 1{\cdot}2$ mm.

At the intersection on the graph of the 80 and 1·2 lines, the oblique dotted line determines the pitch of the teeth: 2·5 mm for fine teeth and 5 mm for coarse teeth. From the same intersection, the oblique full line determines the number of teeth: 100 for fine toothing and 48 for coarse toothing.



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